

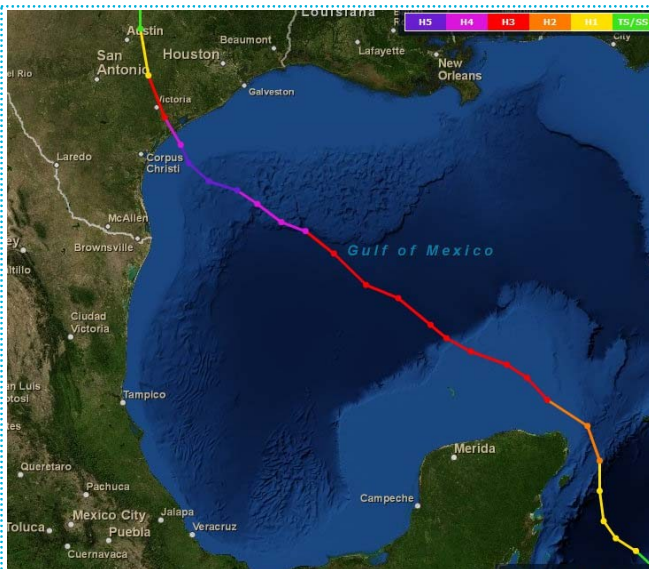
# South Texas Weather Journal

NWS Corpus Christi, TX

Summer 2011 Edition

## 50th Anniversary of Hurricane Carla

Tim Tinsley - Lead Forecaster



(Above) Track and intensity of Hurricane Carla

Although fifty years have passed, no other hurricane has made landfall in Texas with the intensity of Carla. It was the most intense hurricane to make landfall on the Texas coast in the 20th century and second in recorded history only to the Indianola hurricane of 1886. In the 20th century, Carla was the last of 6 hurricanes to make landfall on the Texas coast as a Category 4. Carla ranks as the 9th most intense hurricane to affect the United States since 1851.

Carla began as a tropical depression in the southwestern Caribbean Sea on September 3rd, 1961. It became a tropical storm off the coast of Honduras on the 5th and quickly gained hurricane strength as it moved north to near the Yucatan Peninsula on the 6th.

After skimming the Yucatan, Carla moved northwest and strengthened to a large, major hurricane over the Gulf of Mexico. The winds increased to around 175 mph early on the morning of the 11th making Carla a Category 5 hurricane. Carla weakened slightly as it made a loop off the coast from Port O'Connor and made landfall as a strong Category 4 hurricane with a minimum central pressure of 931 millibars and sustained winds of 145 mph.

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A hurricane watch was issued for the entire Texas coast on September 8th and upgraded to a warning on the 9th. The warning prompted a large scale evacuation of the islands and low lying coastal areas of Texas and Southwest Louisiana, which were devastated by Hurricane Audrey in June of 1957. The evacuation of half a million people was determined to be the largest evacuation in United States history up to that time. The evacuation impacted the number of fatalities associated with the storm which killed 46 people. In comparison, the storm surge from Hurricane Audrey led to 416 fatalities in Louisiana and extreme Southeast Texas.

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(Above) Photo of storm surge in Rockport, TX

Carla was an extremely large hurricane with devastating effects from winds and storm surge for the Middle and Upper Texas coast. The highest sustained wind speeds reported were 115 mph at Matagorda, 110 mph at Victoria, and 88 mph at Galveston. Extreme peak wind gusts were estimated to be near 170 mph at Port Lavaca as the wind instrument blew away after reading 153 mph. Wind gusts were estimated to be around 150 mph at Victoria, Port Aransas, and Edna. Wind gusts of 80 to 90 mph were reported across Corpus Christi. Carla's storm surge devastated the Texas coast, rising to 10 feet above normal along a 300 mile swath from Port Aransas to Sabine Pass. The storm surge rose to 22 feet above mean sea

level at the head of Lavaca Bay in Port Lavaca making it the highest storm surge in Texas hurricane history. Total inundation of Texas coastline was around 1.7 million acres with the storm surge reaching 10 miles inland in places.



(Above) Photos of devastation at Indianola (left) and Port O'Connor (right)

Property damage for the coastal communities of the Middle and Upper Texas coast was catastrophic. Port O'Connor, Palacios, and Indianola were leveled by a storm surge of 15 to 17 feet above mean sea level along with the devastating winds. Matagorda Island Air Force Base was almost completely destroyed. Estimated property damage exceeded \$2.36 billion dollars in reference to 2010 dollar value.





# HURRICANE OUTLOOK

## 2011 Hurricane Outlook

Mike Gittinger - Lead Forecaster

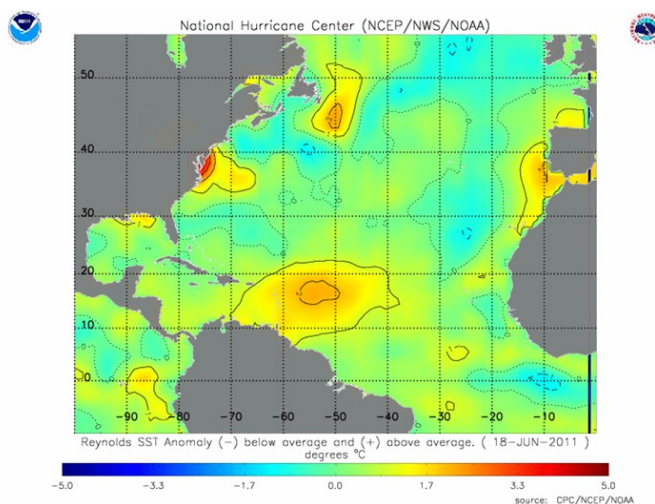
The Atlantic basin is expected to see an above-normal hurricane season this year, according to the seasonal outlook issued by the Climate Prediction Center – a division of the National Weather Service. Across the entire Atlantic Basin for the six-month season, which began June 1, NOAA is predicting the following ranges this year:

- 12 to 18 named storms (winds of 39 mph or higher), of which:
- 6 to 10 could become hurricanes (winds of 74 mph or higher), including:
- 3 to 6 major hurricanes (Category 3, 4 or 5; winds of 111 mph or higher)

Each of these ranges has a 70 percent likelihood of occurring, and indicates that activity will likely exceed the seasonal average of 11 named storms, 6 hurricanes and 2 major hurricanes. Climate factors considered for this outlook are:

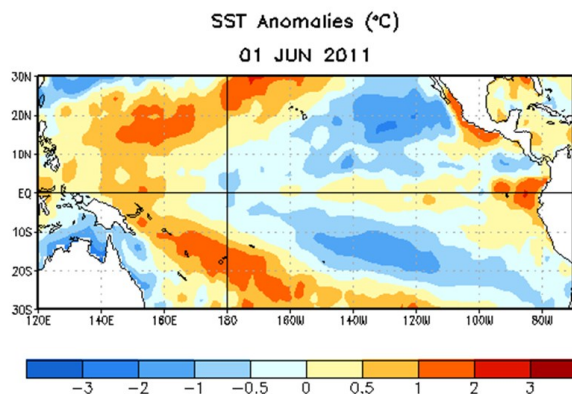
- A continuation of the high activity cycle. Since 1995, the tropical multi-decadal signal has brought ocean and atmospheric conditions conducive for development in sync, leading to more active Atlantic hurricane seasons.

- Warm Atlantic Ocean water as shown in Figure 1. Sea surface temperatures where storms often develop and move across the Atlantic are up to two degrees Fahrenheit warmer-than-average.



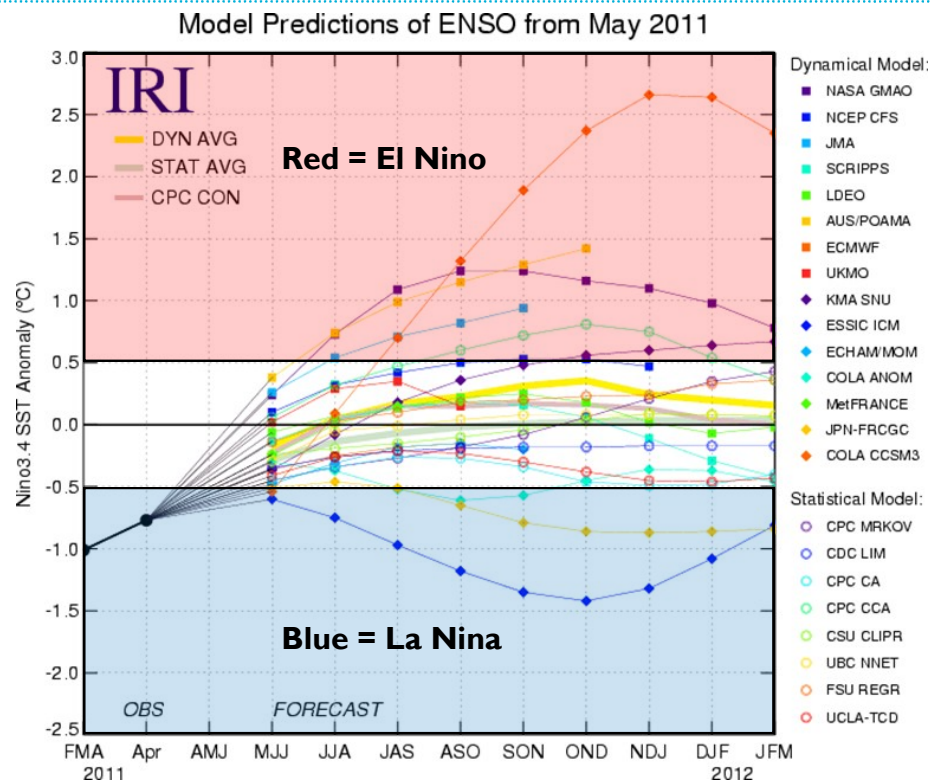
(Above) Figure 1: Atlantic sea surface temperature anomalies as of June 18, 2011

- La Niña, which continues to weaken in the equatorial Pacific Ocean, is expected to dissipate in June, but its impacts, such as reduced wind shear, are expected to continue into the hurricane season. Figure 2 shows what was left of La Nina (the small area of below normal sea water temperatures off the Central American coast) on June 1, 2011.



(Above) Figure 2: Pacific sea surface temperature anomalies as of June 1, 2011

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(Above) Figure 3 shows the model consensus points to a return to neutral conditions over the summer and continuing into the fall.

“In addition to multiple climate factors, seasonal climate models also indicate an above-normal season is likely, and even suggest we could see activity comparable to some of the active seasons since 1995,” said Gerry Bell, Ph.D., lead seasonal hurricane forecaster at NOAA’s Climate Prediction Center.

Unfortunately, NOAA’s seasonal hurricane outlook can’t predict where and when any of these storms may hit. The 2010 season really brought this issue to light as it was the 3rd busiest season on record with 19 named storms, but since few threatened the United States many residents recall it as being a quiet year. The flip side of this was 1992 when only six named storms occurred, but one of these was Hurricane Andrew which is still one of the most devastating storms in U.S. history. This just drives home the point that it only takes one strong landfalling storm to make for a bad hurricane season. Landfall is dictated by weather patterns in place at the time the storm approaches. For each storm, NOAA’s National Hurricane Center forecasts how these weather patterns affect the storm track, intensity and landfall potential.

“Now is the time, if you haven’t already, to get your plan together for what you and your family would do if disaster strikes. Visit [ready.gov](http://ready.gov) to learn more. And if you’re a small business owner, visit [www.ready.gov/business](http://www.ready.gov/business) to ensure that your business is prepared for a disaster,” added Fugate. Hurricane impacts are not limited to the coastline; strong winds and flooding rainfall often pose a threat across inland areas along with the risk for tornadoes.

To help prepare residents of hurricane-prone areas, NOAA unveiled a new set of video and audio public service announcements featuring NOAA hurricane experts and the FEMA administrator that are available in both English and Spanish. These are available at: <http://www.hurricanes.gov/prepare>.

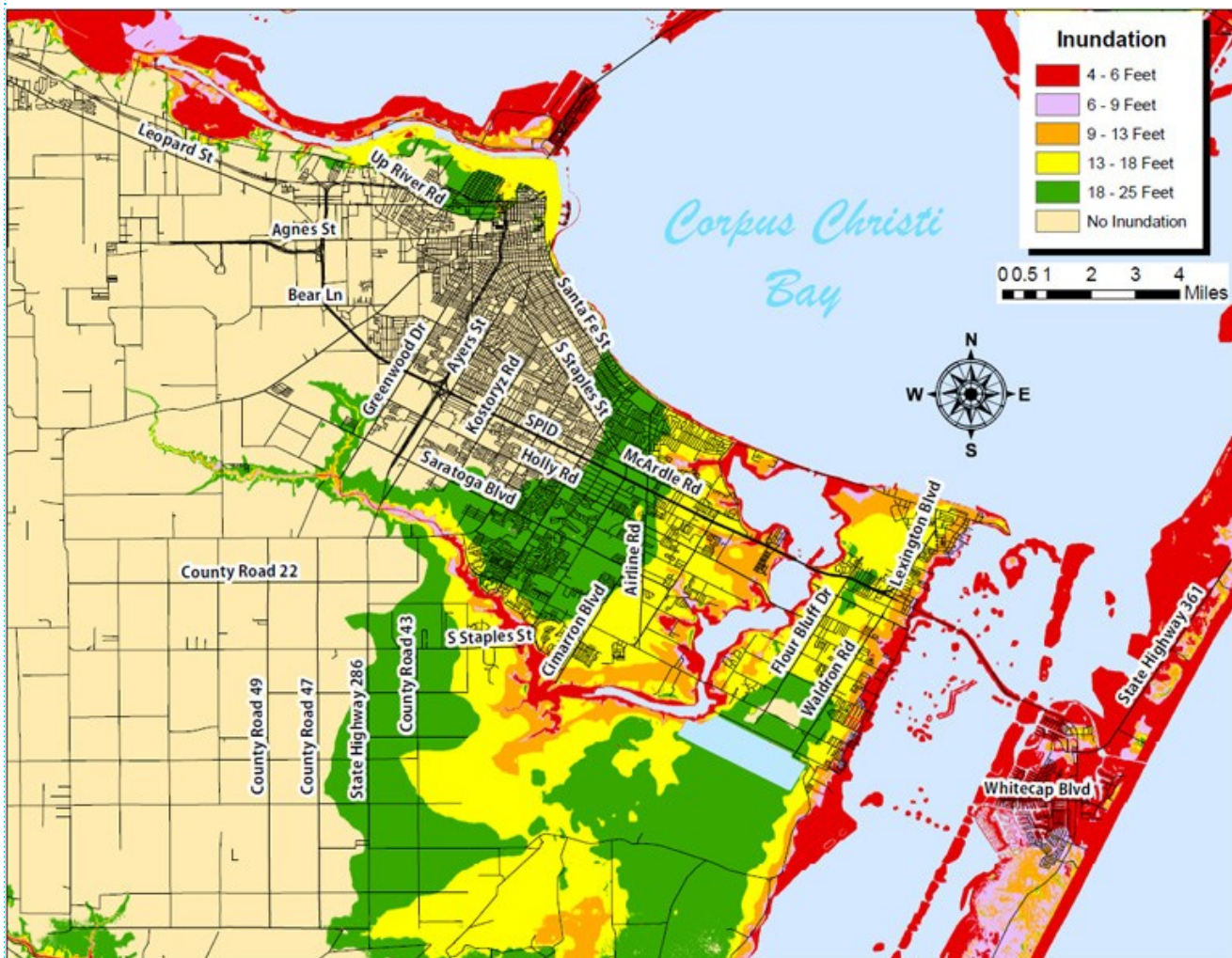


# PREPAREDNESS

**Storm Surge is the #1 Hurricane Related Killer – See if You Live in the Storm Surge Zone!**

**John Metz - Warning Coordination Meteorologist**

National Weather Service Meteorologist Andrew Kennedy and student volunteer Jaclyn Jackson created new storm surge elevation maps for our 2011 Hurricane Guides. These maps are essentially elevation maps based on the latest LiDAR study of the Coastal Bend region. Historically, storm surge is the deadliest hazard associated with hurricanes. Thus it's important to know if you live in a surge zone, and if so, what the approximate elevation of your home is. If you do live in the surge zone you should strongly consider purchasing flood insurance and most certainly evacuate when local officials make the call.



Additional high resolution maps for other areas of the Coastal Bend are available on our website at: <http://www.srh.noaa.gov/crp/?n=stormsurge>





# A LOOK BACK

## A Statistical Review of Spring 2011

Matt Grantham - Meteorologist Intern

### Spring Statistics - Corpus Christi, TX

	March 2011	April 2011	May 2011	June 2011	Mar - Jun 2011	Mar - Jun Normal (1971-2000)
Mean Temp Departure based on (1971-2000)	+2.7°	+5.4°	+1.7°	+1.9°	+2.9	-
Mean Temp Rank (1887-2011)	20th warmest	4th warmest	21st warmest	7th warmest	3rd warmest	-
Observed Rainfall	0.29	0.01	1.95	1.11	3.36	10.80
Rainfall Departure	-1.45	-2.04	-1.53	-2.42	-7.44	-
Highs 90°F or Higher	0	7	16	22	45	28.7
Warmest Temp	84°	98°	95°	98°	98°	-

### Spring Statistics - Victoria, TX

	March 2011	April 2011	May 2011	June 2011	Mar - Jun 2011	Mar - Jun Normal (1971-2000)
Mean Temp Departure based on (1971-2000)	+4.7°	+6.3°	+1.5°	+3.2°	+3.9°	-
Mean Temp Rank (1902-2011)	12th warmest	2nd warmest	26th warmest	3rd warmest	1st warmest	-
Observed Rainfall	0.96	0.03	1.58	0.90	3.47	15.30
Rainfall Departure	-1.29	-2.94	-3.54	-4.06	-11.83	-
Highs 90°F or Higher	0	6	17	23	46	27.4
Warmest Temp	86°	97°	95°	101°	101°	-



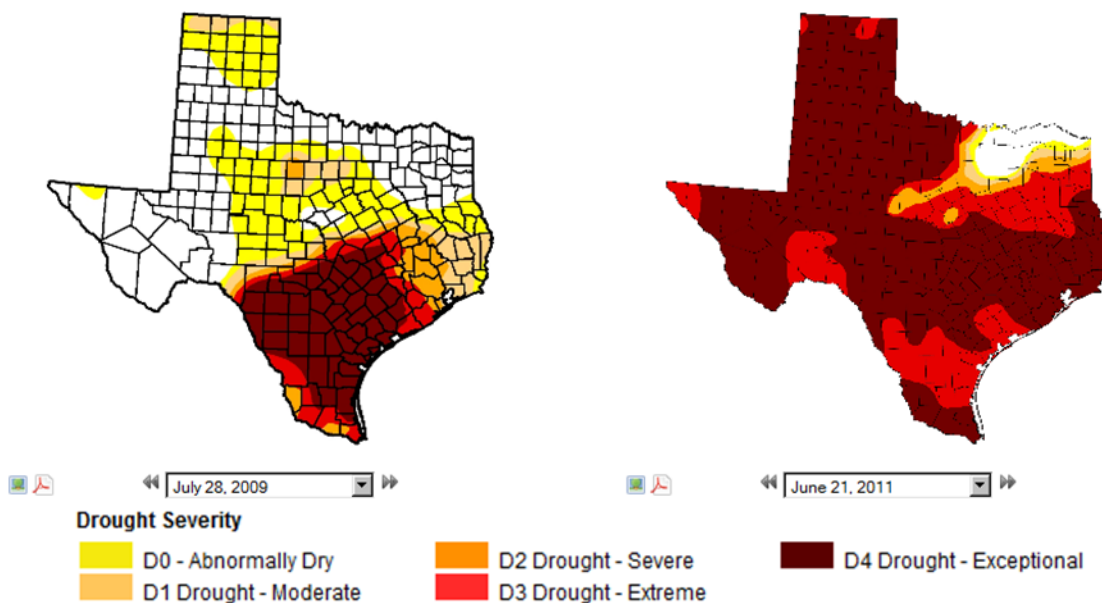
# LOOKING AHEAD

## Historical Drought Third Worst in Texas History: Is There Light at the End of the Tunnel (in the Form of Rain)?

**Greg Wilk - Lead Forecaster**

As some of you may know, rainfall has been below normal over South Texas since autumn of 2010, and the drought severity continues to worsen. Dr. John Nielsen-Gammon, the Texas State Climatologist, rates the current drought over all of Texas as the third worst in recorded history, with 1918 and 1956 being the worst years, respectively. His analysis is based on the commonly-used Palmer Drought Severity Index (PDSI) compiled over the ten Texas climate divisions. Dr. Nielsen-Gammon also notes that the period October 2010 through May 2011 was the driest October through May in Texas recorded history, as well as the driest eight month period in history. The only reason that 1918 and 1956 were worse, Dr. Nielsen-Gammon concludes, is that those two years were preceded by previous dry years, making water shortages more acute.

How does the current drought over South Texas compare with the drought of 2009? As the figure below indicates, drought conditions near the peak of the 2009 drought were worse over South Texas than they have been recently. In 2009, nearly all of South Texas was in exceptional drought, while recent drought conditions have most of our area in extreme drought. However, as the figure below shows, a very large portion of Texas has recently been in exceptional or extreme drought. Since the current drought has encompassed a larger portion of the state, the 2011 drought is considered worse than the drought of 2009 (and the third worst in Texas history).



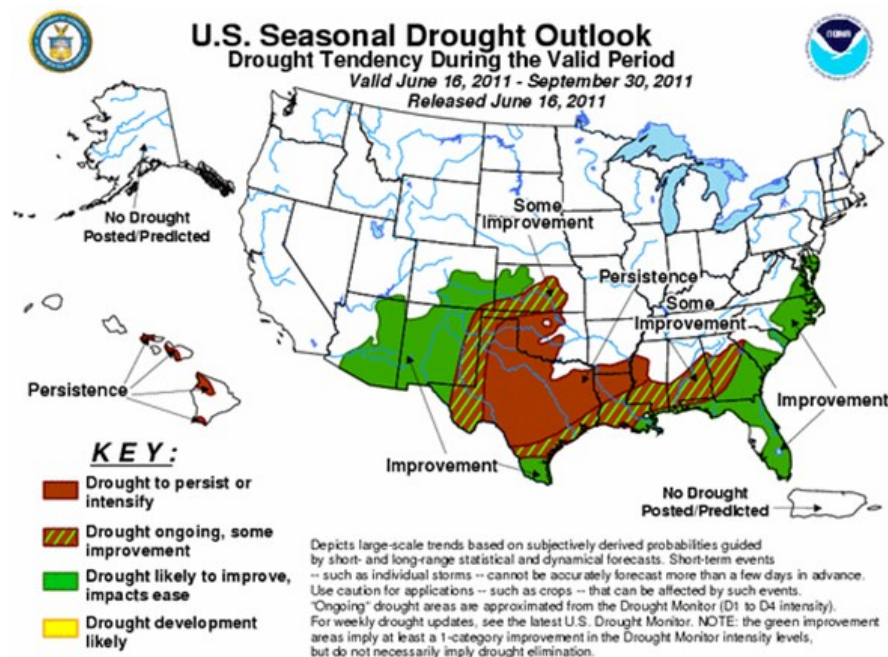
(Above) Figure 1: Comparison between the drought conditions over Texas on July 28, 2009 (left) and on June 21, 2011 (right). Note that during 2009 drought conditions over South Texas were worse than during the ongoing drought, but a much larger portion of the state is experiencing either exceptional or extreme drought this year.

(Continued on Page 8)



The current drought is largely the result of the La Nina conditions which developed during the summer of 2010. La Nina conditions are cooler than normal water temperatures in the Eastern Pacific Ocean, which normally results in below normal rainfall to Texas. Fortunately, the La Nina ended during the first part of June, and more neutral conditions are expected over the area through at least the summer of 2011.

What does the end of La Nina mean for Texas in general (and South Texas in particular)? Normally, this means that South Texas should eventually return to a more normal rainfall pattern in the upcoming months. The latest three month rainfall outlook for the period July through September (not shown) forecasts an equal chance for below/near/above normal precipitation, with above normal temperatures most likely during this time (the latter is due in part to the on-going drought, since dry soils heat more readily than wet grounds). Because of this, the latest Drought Outlook Product (shown below), valid through the end of September 2011, shows conditions likely improving (and impacts easing) over Deep South Texas and extreme southern portions of the Coastal Bend, with some improvement (but the drought continuing) over the remainder of the Coastal Bend. Interestingly, note that the drought is forecast to persist over much of North and Central Texas through the summer. However, since forecasts can and do change with time, an improvement in drought conditions may eventually be forecast for this area in the upcoming weeks (the Drought Outlook product is updated every other week).



(Above) Figure 1: Drought Outlook Product issued on June 16, 2011. Note the improvements over portions of South Texas, but not in other parts of the state. This product is updated every other week.

To keep track of the current drought and its outlook, visit our Drought Page by either clicking on the thumbnail/icon "Drought Info" located near the bottom right of our homepage, or type: <http://www.srh.noaa.gov/crp/?n=drought>. Drought information specific to South Texas can be found in our Drought Information Statements, located at the top of our South Texas Drought Page. Hopefully beneficial and widespread rainfall will return to South Texas, but not in the form of a slow-moving major hurricane, making a direct hit on the area.





# STAFF SPOTLIGHT

## New Journeyman Forecaster - Penny Zabel

Penny Zabel joined the NWS Corpus Christi office in May 2011 as a Journeyman Forecaster. Penny came to South Texas from Milwaukee, Wisconsin where she worked with the NWS for two and a half years. She previously worked in Houston with a marine weather forecasting company. Being from the North (Iowa), Penny learned in Houston that winters don't have to be snowy with freezing temperatures for three months, and because of this, she's happy to have the opportunity to return to the South. Penny is a graduate of Iowa State University with a degree in meteorology and a minor in journalism. Outside of work, Penny is a big baseball fan and is also interested in photography.

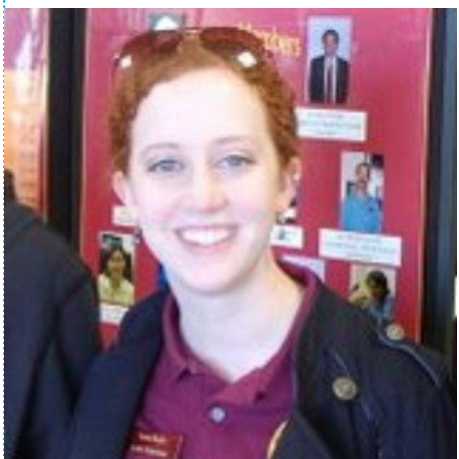
## New Journeyman Forecaster - Christina Barron



Christina Barron is one of the new Journeyman Forecasters at the NWS Corpus Christi office. Prior to her promotion, she was an Intern at the Corpus Christi office for 3 years, joining the staff back in the summer of 2008 (with Hurricane Dolly part of the welcoming committee). While here, she has overseen the Upper Air and Climate Programs, as well as the local rainfall network, CoCoRaHS (Community Collaborative Rain, Hail & Snow Network).

Christina graduated from Texas A&M University with a degree in meteorology and is a proud member of the Fighting Texas Aggie Class of 2008 (Whoop!). While at A&M, she enjoyed going to all the football, basketball, and baseball games, and still attends them whenever possible.

## New Meteorologist Intern - Lara Keys



Lara Keys recently graduated from the University of Louisiana at Monroe with a BS in Atmospheric Science. In her time at ULM she served as the secretary and then the president of the local student chapter of the American Meteorological Society. In 2008 she began working as a SCEP at the NWS WFO in Shreveport, LA. In her free time she enjoys reading books, taking her dog Wisp for walks, hiking, and watching movies.

[www.weather.gov/corpuschristi](http://www.weather.gov/corpuschristi)

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